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ELECTRIFICATION OF WARSAW SUBURBAN RR LINES

The electrified rail line between Warsaw and Zyrardow, opened to traffic on 17 January 1950, was the third line in the Warsaw suburban area to be electrified. In contrast to the prewar period, when almost all work was under the direction of foreign specialists, all recent electrification work in the rail center of Warsaw has been carried out by Polish workers, technicians, and engineers. The electrical equipment and overhead lines were manufactured exclusively by Polish industry.

Between 1951 and 1955, the Polish State Railroads will convert the remaining lines in the Warsaw rail center to electrical operation. The length of electrified line will then be twice the prewar length.

The greatest difficulty is the shortage of cars. Even today there has to be mixed traffic on the three electrified lines, and electric train traffic must be supplemented by steam-powered trains. The rolling stock, however, is being steadily enlarged, and there is also the possibility of running trains with electric locomotives. In mid-1953, the rolling stock will be increased by the delivery of new train units, some of which have been ordered in foreign countries and some of which are being build in Poland. The first units ordered will be available at the end of 1950.

The new train units, the designs for which take into account both the experience gained in operating the old rolling stock and the advice of Polish builders, represent important advances in comparison with prewar types. Basically the three-car type is maintained, but the motor car is the center car instead of the front car. Each car has a separate chassis. The capacity of train units of the old and new types is as follows:

With four persons per square meter: old type, 425; new type, 512; three cars -- 1,536 passengers.

With six persons per square meter: old type, 528; new type, 670; three cars -- 2,100 passengers.

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Maximum permissible load:

With eight persons per square meter: old type, 631; new type, 830; three cars -- 2,490 passengers.

This favorable result was attained by reducing the number of seats slightly, from 220 to 200, and by widening the aisle between the seats from 51 centimeters to 78 centimeters. This arrangement considerably increases the amount of standing room, and eases particularly the commuter traffic, which is more than six times the average load per hour.

A comparison between the transportation capacity of an electric train unit and of a steam-powered train of maximum length (15 three-axle cars with side doors) may be made from the following data on steam train capacity:

With four persons per square meter: 1,200 passengers

With six persons per square meter: 1,450 passengers

With eight persons per square meter: 1,700 passengers

Number of seats per car: 48-50

Standing room: 9-10 square meters

Basic data for train units used for Warsaw suburban traffic is as follows:

	<u>Old Type Unit</u>	<u>New Type Unit</u>
Net weight	113 t	106 t
Electric current consumption	4 x 151.2 kw-h	4 x 166 kw-h
Amperage	4 x 112 ah	4 x 123 ah
Traction power	4 x 1,210 kg	4 x 1,370 kg
Continuous current consumption	4 x 108 kw	4 x 120 kw
Maximum speed	100 km/h	100 km/h
Weight of motor car	55 t	50 t
Weight of the two trailer cars	58 t	56 t

Electrification of all trains in the Warsaw rail center is expected to effect savings which will run into millions. Besides cash savings from operations, the time saved by passengers must also be taken into account.

The following table shows the reduction in travel time on the individual lines. In addition, electric train traffic permits a greater density of traffic, which in turn affords still greater savings of time.

Comparison of Travel Time

Downtown Warsaw to Otwock.

Steam trains, 57 min

Electric trains, 43 min

Saving of time, 14 min (25%)

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Downtown Warsaw to Zyrardow
Steam trains, 73 min
Electric trains, 59 min
Saving of time, 14 min (19%)

Downtown Warsaw to Minsk
Steam trains, 70 min
Electric trains, 49 min
Saving of time 21 min (30%)

The Six-Year Plan anticipates a yearly traffic of 90 million passengers in the rail center of Warsaw. If an average of only 10 minutes is saved for each passenger, this would total 15 million hours, which at the present average hourly wage of 50 zlotys is the equivalent of 750 million zlotys yearly.

Electrified train operation also means a great saving in coal. The above-mentioned number of passengers carried by electric trains would correspond to 1,200,000,000 gross ton-kilometers. Since steam trains of the same capacity are heavier, and the number of trains and their length cannot be adjusted to the changing traffic density, the corresponding figure for ton-kilometers for steam trains would be at least twice as large. Since the coal consumption is especially heavy for suburban traffic, a coal saving can be estimated of at least 180,000 tons per year, or 80 percent of the coal which would be used by steam trains. The savings will probably be 60-70 percent greater than the average on the electrified main lines.

The use of mobile transformer stations is new in Poland. The use of such stations in 1949 made it possible to start operation of electric trains to Mi-losna, Minsk, and downtown Warsaw, and assured the supply of electricity for the existing electric lines. In the near future, these mobile transformer stations will serve as a reserve should a stationary unit be out of service for a prolonged period. At the same time, mobile transformers will speed electrification of additional rail lines, as they can be set up and put into operation in a new location in a comparatively short time.

The Six-Year Plan provides that after the main railroad station in Warsaw is put into service, all through steam trains will be taken through the city by electric locomotives.

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